

## Brief Explanation of Producer Prices Indexes (Technical Note)

The Bureau of Labor Statistics (BLS) term Producer Price Index (PPI) refers to a family of indexes that measure the average change over time in the prices received by domestic producers of goods and services. PPIs measure price change from the perspective of the seller. This contrasts with other measures, such as the Consumer Price Index (CPI); CPIs measure price change from the purchaser's perspective. Sellers' and purchasers' prices can differ due to government subsidies, sales and excise taxes, and distribution costs.

More than 8,000 PPIs for individual products and groups of products are released each month. PPIs are available for the products of virtually every industry in the mining and manufacturing sectors of the U.S. economy. New PPIs are gradually being introduced for the products of industries in the trade, finance, and services sectors of the economy.

More than 100,000 price quotations per month are organized into three sets of PPIs: (1) Stage-of-processing indexes; (2) commodity indexes; and (3) indexes for the net output of industries and their products. The stage-of-processing structure organizes products by class of buyer and degree of fabrication. The commodity structure organizes products by similarity of end use or material composition. The entire output of various industries is sampled to derive price indexes for the net output of industries and their products.

### Stage-of-Processing Indexes

Within the stage-of-processing system, finished goods are commodities that will not undergo further processing and are ready for sale to the final-demand user, either an individual consumer or business firm. Consumer foods include unprocessed foods such as eggs and fresh vegetables, as well as processed foods such as bakery products and meats. Other finished consumer goods include durable goods such as automobiles, household furniture, and appliances, as well as nondurable goods such as apparel and home heating oil. Capital equipment includes producer durable goods such as heavy motor trucks, tractors, and machine tools.

The stage-of-processing category for intermediate materials, supplies, and components consists partly of commodities that have been processed but require further processing. Examples of such semifinished goods include flour, cotton yarn, steel mill products, and lumber. The intermediate goods category also encompasses nondurable, physically complete items purchased by business firms as inputs for their operations. Examples include diesel fuel, belts and belting, paper boxes, and fertilizers.

Crude materials for further processing are products entering the market for the first time that have not been manufactured or fabricated and that are not sold directly to consumers. Crude foodstuffs and feedstuffs include items such as grains and livestock. Examples of crude nonfood materials include raw cotton, crude petroleum, coal, hides and skins, and iron and steel scrap.

### Commodity Indexes

The commodity classification structure of the PPI organizes products by similarity of end use or material composition, disregarding industry of origin. Fifteen major commodity groupings (2-digit commodity codes) make up the All Commodities Index. Each major commodity grouping includes (in descending order of aggregation) subgroups (3-digit), product classes (4-digit), subproduct classes (6-digit), and individual items (8 digit).

Nearly all 8-digit commodities under the traditional commodity coding system are now derived from corresponding industry-classified product indexes. In such instances, movements in the traditional commodity price indexes and corresponding percent changes will be virtually identical to their industry-based counterparts, even if their index levels differ.

## Industry Net-Output Price Indexes

PPIs for the net output of industries and their products are grouped according to the North American Industry Classification System (NAICS). Prior to the release of January 2004, industry-based PPIs were published according to the Standard Industrial Classification (SIC) system. Industry price indexes are compatible with other economic time series organized by industry, such as data on employment, wages, and productivity. Table 5 of the PPI Detailed Report includes data for NAICS industries and industry groups (3-, 4-, 5-, and 6-digit codes); indexes for Census product classes (7- and 8-digits), products (9-digits), and more detailed subproducts (11-digits); and, for some industries, indexes for other sources of revenue.

Indexes may represent one of three kinds of product indexes. Every industry has primary product indexes to show changes in prices received by establishments classified in the industry for products made primarily, but not necessarily exclusively, by that industry. The industry classification of an establishment is determined by which products comprise a plurality of its total shipment value. In addition, most industries have secondary product indexes that show changes in prices received by establishments classified in the industry for products chiefly made in some other industry. Finally, some industries have miscellaneous receipts indexes to show price changes in other sources of revenue received by establishments within the industry that are not derived from sales of their products, for example, resales of purchased materials, or revenues from parking lots owned by a manufacturing plant.

### Data Collection

PPIs are based on selling prices reported by establishments of all sizes selected by probability sampling, with the probability of selection proportionate to size. Individual items and transaction terms from these firms are also chosen by probability proportionate to size. The BLS strongly encourages cooperating companies to supply actual transaction prices at the time of shipment to minimize the use of list prices. Prices submitted by survey respondents are effective on the Tuesday of the week containing the 13th day of the month. This survey is conducted primarily through the mail.

Price data are provided on a voluntary and confidential basis; only sworn BLS employees are allowed access to individual company price reports. BLS publishes price indexes instead of unit dollar prices. All PPIs are subject to revision 4 months after original publication to reflect the availability of late reports and corrections by respondents.

BLS periodically updates the PPI sample of survey respondents to better reflect current conditions when the structure, membership, technology, or product mix of an industry shifts significantly and to spread reporting burden among smaller firms. Results of these resampling efforts are incorporated into the PPI with the release of data for January and July.

### Weights

Weights for most traditional commodity groupings of the PPI, as well as weights for commodity-based aggregate indexes calculated using traditional commodity groupings, such as stage-of-processing indexes, currently reflect 1997 values of shipments as reported in the Census of Manufactures and other sources. From January 1996 through December 2001, PPI weights were derived from 1992 shipment values. Industry indexes also are now calculated with 1997 net output weights. This periodic update of the value weights used to calculate the PPI is done to more accurately reflect changes in production and marketing patterns in the economy. Net output values of shipments are used as weights for industry indexes. Net output values refer to the value of shipments from establishments within the industry to buyers outside the industry. However, weights for commodity price indexes are based on gross shipment values, including shipment values between establishments within the same industry. As a result, broad commodity grouping indexes, such as the PPI for All Commodities, are affected by the multiple counting of price change at successive stages of processing, which can lead to exaggerated or misleading signals about inflation. Stage-of-processing indexes partially correct this defect, but industry indexes consistently correct for this at all levels of aggregation. Therefore, industry and stage-of-processing indexes are more appropriate than broad commodity groupings for economic analysis of general price trends.

### Price Index Reference Base

Effective with publication of January 1988 data, many important PPI series (including stage-of-processing groupings and most commodity groups and individual items) were placed on a new reference base, 1982=100. From 1971 through 1987, the standard reference base for most PPI series was 1967=100. Except for rounding differences, the shift to the new reference base did not alter any previously published percent changes for affected PPI series. (See "Calculating Index Changes," below.) The 1982 reference base is not used for commodity indexes with a base later than December 1981 or for industry net output indexes and their products.

For further information on the underlying concepts and methodology of the Producer Price Index, see chapter 14, "Producer Prices," in BLS Handbook of Methods (April 1997), Bulletin 2490. This document can be downloaded from the BLS website at ([http://www.bls.gov/opub/hom/homch14\\_itc.htm](http://www.bls.gov/opub/hom/homch14_itc.htm)), and reprints are available on request.

### Calculating Index Changes

Each PPI measures price changes from a reference period which equals 100.0. An increase of 5.5 percent from the reference period in the Finished Goods Price Index, for example, is shown as 105.5. This change can also be expressed in dollars, as follows: Prices received by domestic producers of a sample of finished goods have risen from \$100 in 1982 to \$105.50. Likewise, a current index of 90.0 would indicate that prices received by producers of finished goods are 10 percent lower than they were in 1982.

Movements of price indexes from one month to another are usually expressed as percent changes, rather than as changes in index points. Index point changes are affected by the level of the index in relation to its base period, whereas percent changes are not. The following example shows the computation of index point and percent changes.

#### Index point change

Finished Goods Price Index	107.5
Less previous index	104.0
Equals index point change	3.5

#### Index percent change

Index point change	3.5
Divided by the previous index	104.0
Equals	0.034
Result multiplied by 100	0.034 x 100
Equals percent change	3.4

### Seasonally Adjusted and Unadjusted Data

Because price data are used for different purposes by different groups, BLS publishes seasonally adjusted and unadjusted changes each month. Seasonally adjusted data are preferred for analyzing general price trends in the economy, because these data eliminate the effect of changes that normally occur at about the same time, and in about the same magnitude, every year—such as price movements resulting from normal weather patterns, regular production and marketing cycles, model changeovers, seasonal discounts, and holidays. For these reasons, seasonally adjusted data more clearly reveal underlying cyclical trends. Unadjusted data are of primary interest to users who need information that can be related to actual dollar values of transactions. Individuals requiring this information include marketing specialists, purchasing agents, budget and cost analysts, contract specialists, and commodity traders. It is the unadjusted data that are generally cited in escalating long-term contracts such as purchasing agreements or real estate leases. (See Escalation and Producer Price Indexes: A Guide for Contracting Parties, BLS Report 807, September 1991, available on request from the BLS.)

In 1998, the PPI implemented the X-12-ARIMA Seasonal Adjustment Method; prior to that year the PPI employed the X-11 method. Each year, the seasonal status of most commodity indexes is re-evaluated to reflect more recent price behavior. Industry net output indexes are not seasonally adjusted. For time series that exhibit seasonal pricing patterns, new seasonal factors are estimated and applied to the unadjusted data for the previous 5 years. These updated seasonally adjusted indexes replace the most recent 5 years of seasonal data.

Seasonal factors may be applied to series using either a direct or aggregative method. Generally, commodity indexes are seasonally adjusted using direct seasonal adjustment, which produces a more complete elimination of seasonal movements than the aggregative method. However, the direct seasonal adjustment process may not yield figures that possess additive consistency. Thus, a seasonally adjusted index for a broad category that is directly adjusted may not be logically consistent with all seasonally adjusted indexes for its components. Seasonal movements for stage-of-processing indexes are derived indirectly through an aggregative method that combines movements of a wide variety of subproduct class (6-digit) series.

Seasonally adjusted indexes can become problematic when previously stable and predictable price patterns abruptly change. If the new pattern persists, the seasonal adjustment method will eventually reflect it adequately; if these patterns keep shifting, however, seasonally adjusted data will become chronically troublesome. This problem occurs relatively infrequently for farm and food-related products but has more often affected manufactured products such as automobiles and steel.

Since January 1988, the PPI has used Intervention Analysis Seasonal Adjustment methods to enhance the calculation of seasonal factors. With this technique, outlier values that may distort the seasonal pattern are removed from the data prior to applying the standard seasonal factor estimation procedure. For example, a possible economic cause for large price movements for petroleum-based products might have been the Persian Gulf War. In this case, intervention techniques allowed for better estimates of seasonally adjusted data. On the whole, very few series have required intervention. Out of nearly 900 seasonally adjusted series, only 16 interventions were performed in 1997.

For more information relating to seasonal adjustment methods, see (1) "Appendix A: Seasonal Adjustment Methodology at BLS," in the BLS Handbook of Methods (April 1997), Bulletin 2490 and (2) "Summary of Changes to the PPI's Seasonal Adjustment Methodology" in the January 1995 issue of Producer Price Indexes.

### **Retrieving PPI data from the PPI Website**

PPI data can be obtained from the WWW address (<http://www.bls.gov/ppi>). Scrolling down the page to the "Get Detailed Statistics" header reveals the following 5 methods of data retrieval:

Most Requested Series is a form-based application that allows the user to quickly obtain PPI time series data by selecting from two separate lists (commodity and industry) of the most commonly requested time series, including the All Commodities Index and the stage-of-processing indexes (for example, Finished Goods). Within each list, any one-or all-of the time series shown can be selected. A user can modify the date range and output options after executing the query, using the reformat button above the data output table.

Create Customized Tables is a form-based query application designed for users unfamiliar with the PPI coding structure. It guides a user through the PPI classification system by listing index titles and does not require knowledge of commodity or industry codes. Data retrieved are based on a query formulated by selecting data characteristics from lists provided.

Two options are available to create customized tables, depending on a user's browser capability. The one-screen option is a JavaScript application that uses a single screen to guide a user through the available time series data. The second option is a multiple screen, nonJava-based application. Both methods allow a user to browse the PPI coding structure and select multiple series codes. Using the one-screen option, users can modify the date range and output options after executing the query using the reformat button above the data output table.

Series Report is a form-based application that uses formatted PPI time series identifiers (commodity or industry codes) as input in extracting data according to a specified set of date ranges and output options. This application provides the most efficient path for those users who are familiar with the format of PPI time series identifiers. Up to 300 indexes can be extracted at one time.

There are three basic formats for creating a unique PPI time series identifier. For commodity and stage-of-processing indexes, enter a "wpu" prefix (not seasonally adjusted) or a "wps" prefix (seasonally adjusted) in combination with a commodity-based code to create a series identifier.

Commodity code	Will provide data for:
wps063	Drugs and pharmaceuticals, seasonally adjusted
wpu063803	Pharmaceutical preparations, cardiovascular system
wpusop3000	Finished goods, not seasonally adjusted

For a current industry-based price index organized according to the North American Industry Classification System (NAICS), enter the prefix "pcu" followed by the industry-product code. The series identifier for products primary to an industry include 12 numeric digits, the six-digit industry code is repeated, and up to seven additional digits of product detail.

Dashes are used as place holders for higher-level industry group codes.

Industry-product code, Current NAICS series	Will provide data for:
pcu325---325---	Chemical manufacturing, not seasonally adjusted
pcu336110336110	Automobile and light duty motor vehicle manufacturing
pcu621111621111411	Offices of physicians, one and two physician practices and single specialty group practices, general/family practices

To identify a discontinued industry-product code based on the Standard Industrial Classification (SIC), enter a "pdu" prefix and "#" between the fourth and fifth characters of the product code. A series identifier for the discontinued dataset uses underscores as placeholders to complete a reference to an SIC industry group code of less than four digits. (All PPI industry-based indexes organized by SIC were discontinued with the introduction of the NAICS.) In all cases, no spaces are permitted.

Industry-product code, Discontinued SIC series	Will provide data for:
pdu28_#	Chemicals and allied products, not seasonally adjusted
pdu331_#	Blast furnaces, steel works, and rolling and finishing mills, not seasonally adjusted
pdu3711#111	Passenger cars

Flat Files and the FTP server are best suited for those users requiring access to either a large volume of time series data or other PPI-related documentation (such as, seasonal factor and relative importance tables). The FTP site can be accessed at (<ftp://ftp.bls.gov>) or directly from the links on the "Get Detailed Statistics" page or the PPI homepage. Data and documentation available for download include:

Data/Documentation	Directory:
NAICS Current Series	/pub/time.series/pc
SIC Discontinued Series	/pub/time.series/pd
Commodity Series	/pub/time.series/wp
Special Requests	/pub/special.requests/ppi
Latest News Release	/pub/news.release/ppi.txt

The FTP site maintains files to help with searches and downloads. These files are centrally located in the /pub/doc directory. Within this directory, go to the overview.txt file for an overview relating to all BLS data available through the FTP site. For commodity-based PPI data (which appear in tables 1, 2, 3, 6, 7, and 8 of the PPI monthly detailed report and tables 1, 2, 3, and 5 of the monthly news release), the program help file is wp.txt. For current industry-based PPI data based on the NAICS (which appear in tables 4, 5, and 9 of the monthly PPI report and table 4 of the monthly news release), the file is pc.txt. For industry-based SIC time series that have been discontinued, go to pd.txt. (These and other help files are also maintained within each of the five directories listed above.)

### **Other Sources of PPI Data**

PPI data can also be accessed via the BLS homepage (<http://www.bls.gov>). After clicking the "Get Detailed Statistics" link at the top of the homepage a chart appears listing all of the available BLS programs. The following four methods are available for PPI data: Most requested statistics, create customized tables (one screen or multiple screens), and flat files. Additional sources of BLS data are also accessible from this page including: Economic news releases, series report, and economy at a glance.

### **Additional information**

The PPI homepage (<http://www.bls.gov/ppi>) contains additional information regarding PPI data and methodology. The top section of the homepage provides PPI news releases, both current and archived, as well as general PPI information. The "Tables Created by BLS" section found beneath the statistics section provides relative importance and seasonal factor tables. The remaining sections offer special notices and publications pertaining to PPI methodology and applications.